

THE SENTINEL

Issue 47

A Publication of the Central Massachusetts Spacemodeling Society

May 2004

CMASS Hosts TARC Qualification Launches

On March 20th and 27th, CMASS held two special launches at Woodsom Farm Park in Amesbury for area high schools that are competing in the Team America Rocket Competition (TARC), which is being sponsored by the Aerospace Industries Association (AIA) and the National Association of Rocketry (NAR). The teams were trying to qualify for the competition finals to be held in Virginia on May 22. The contest is to launch two raw eggs and an altimeter to 1,250 feet using a rocket with two or more stages, without cracking the eggs.

Each team is allowed two attempts to make a qualifying flight, which must be witnessed by a Senior member of the NAR. The flights are scored by how close they come to 1,250 feet, so a perfect score is zero. Even one cracked egg, however, disqualifies the flight. When a team makes a successful qualification flight, they send their score to contest headquarters (www.rocketcontest.org), which will then select the 100 teams with the best scores for the finals. If a team has two successful qualification flights, their best score is used. Nationwide, over 600 teams have registered for the contest.

During the launch, teams were allowed to make as many test flights as they wanted, they just had to declare before launching if the flight was a test flight or a qualification attempt. Including test flights, over both days eight teams from seven schools in two states made seventeen flights.



The Lynnfield High School Dokateers (photo: Bill Spadafora)

Acting as NAR witnesses were Bill Spadafora, Bob Krech, and Ed Pattison-Gordon. CMASS Secretary Peter Chestna handled getting permission from the town of Amesbury — and the hay farmer — to let us use the Park for the launches as well as getting waivers from the FAA for each launch.

Update: Eight Massachusetts teams made successful qualification flights by the deadline. On April 19th the AIA and the NAR announced that, because of a tie, 101 teams had qualified for the national competition. Among them: Saint John's Academy, Shrewsbury, MA and the Junior/Senior Team, Thayer Academy, Braintree, MA.

The Teams and Their Flying Machines

Here are the teams' solutions to the problem. A table summarizes each team's flights. Columns: Eggs -number uncracked; Alt -altitude; Q/T -Qualification or Test flight; Q? -was qualification flight successful; Score -difference from 1250 or DQ.

Beverly High School, Beverly, MA

<u>Motors</u>	<u>Eggs</u>	<u>Alt.</u>	<u>Q/T</u>	<u>Q?</u>	<u>Score</u>	<u>Comments</u>
5x B6-0 → 5x B6-6	2	910	Q	Y	340	Nose body separation, but body tumbled.
5x C6-0 → 5x C6-5	0	850	Q	N	DQ	Chute tangled.



This rocket burned 10 motors for each flight, the most of all the rockets flown during the two launches. It was scratch built from free materials. The nose was shaped from florist foam, then fiberglassed. The body tube is the plastic core from a roll of paper. The fins are cardboard. Right: Plastic body was melted by the heat of the exhaust from five motors. (right photo: Bill Spadafora)



Cambridge Rindge and Latin, Cambridge, MA

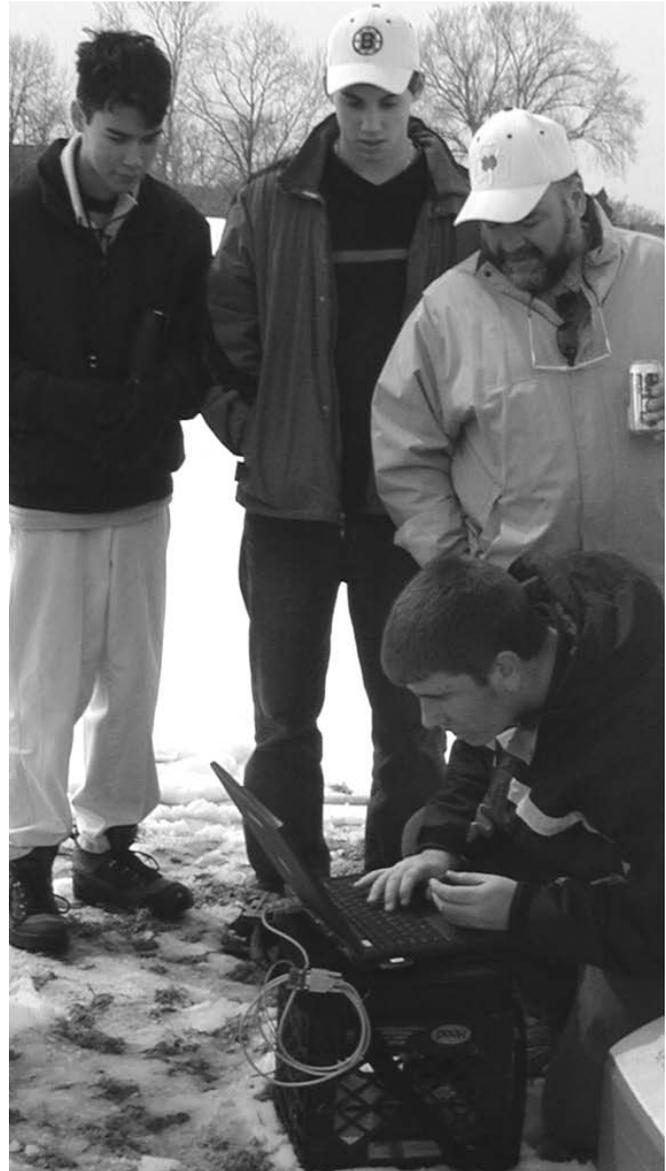
<u>Motors</u>	<u>Eggs</u>	<u>Alt.</u>	<u>Q/T</u>	<u>Q?</u>	<u>Score</u>	<u>Comments</u>
D12-0 → E9-4	1	1111	Q	N	DQ	



The Cambridge Rindge and Latin team had made a qualifying flight before coming to the CMASS launch and was trying to improve their score. Not a bad altitude, but the chute tangled and an egg broke. Bob Krech looks on holding the board o'score-keeping.

Lynnfield High School, Lynnfield, MA

<u>Motors</u>	<u>Eggs</u>	<u>Alt.</u>	<u>Q/T</u>	<u>Q?</u>	<u>Score</u>	<u>Comments</u>
4x C6-5, D12-0 → E9-6	2	669	T	-	-	Booster remained attached to sustainer. Caught a thermal!
4x C6-5, D12-0 → E9-6	2	1009	T	-	-	Nice flight.
2x C6-5, 2x D12-3, D12-0 → E9-6	0	938	T	-	-	Booster remained attached to sustainer. Chute tangled.
2x C6-5, 2x D12-3, D12-0 → E9-6	1	1214	Q	N	DQ	Lost chute: swivel clip let go.
3x D12-3, D12-0 → E9-6	2	1028	Q	Y	222	Success!



Upper Left: When the upper stage motor fired it kicked out the one motor beneath it, but left the booster attached.

Right: Flight data downloaded from the altimeter verifies what everyone suspected: the rocket had caught a thermal. "By the time that rocket comes down, the eggs will have hatched," cracked Ken Blade.

Lower Left: Lynnfield came prepared with two complete rockets. The student preparing this one clearly has learned the importance of holding your tongue right. (photos: Bill)

Milton Academy, Milton, MA

<u>Motors</u>	<u>Eggs</u>	<u>Alt.</u>	<u>Q/T Q?</u>	<u>Score</u>	<u>Comments</u>
D12-0 → E9-6	0	?	T	-	- Severe weather-cocking, sustainer hit tree trunk 200 yds away.



This rocket traveled a long way, much of it horizontal, only to be completely destroyed when it hit the trunk of an evergreen.

Your words and pictures could be here

-in this tiny space-

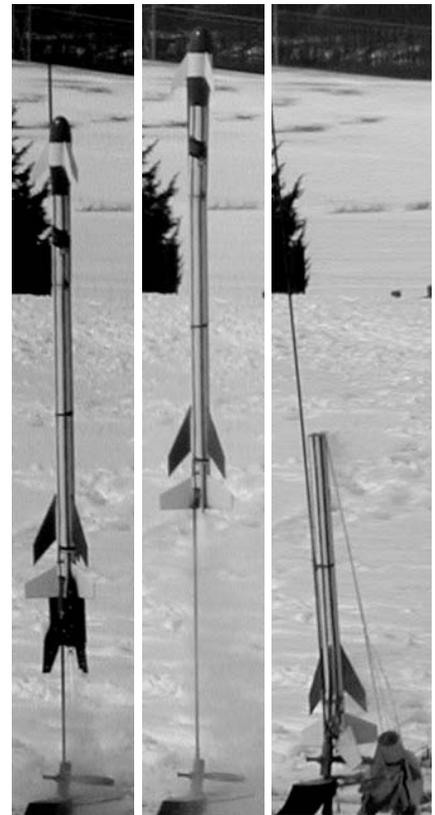
or, if you have more to contribute, filling up entire pages of

THE SENTINEL.

Send submissions to sentinel@cmass.org

Salem High School, Salem, NH

<u>Motors</u>	<u>Eggs</u>	<u>Alt.</u>	<u>Q/T Q?</u>	<u>Score</u>	<u>Comments</u>
D12-0 → D12-0 → E9-8	0	0	Q	-	- All three stages hung on rod; doesn't count as a flight.
3x B6-2, D12-0 → D12-0 → E9-6	0	?	T	-	- Severe weather-cocking, sustainer hit ground before ejection.



The only three-stage entry at the launches. A little dance to please the rocket gods doesn't hurt, but sometimes it doesn't help. Larger launch lugs and more engines in the first stage got their rocket off the pad at the second launch. (right 3 photos: Bill)

Saint John’s Academy, Shrewsbury, MA

<u>Motors</u>	<u>Eggs</u>	<u>Alt.</u>	<u>Q/T</u>	<u>Q?</u>	<u>Score</u>	<u>Comments</u>
F50-4 → C11-3	2	1202	Q	Y	48	Chute did not deploy, but rocket descended horizontally.



The Saint John’s team discovered that a black-powder upper stage motor can be lit from the ejection charge of a composite booster motor. The F40-4 carried the rocket most of the way and the short delay insured it was still pointed up when the ejection charge fired, igniting the C11-3 in the sustainer. At right the eggs are unwrapped after the flight for inspection by the Senior NAR witnesses. (center and right photos: Bill)

Freshman/Sophomore Team, Thayer Academy, Braintree, MA

<u>Motors</u>	<u>Eggs</u>	<u>Alt.</u>	<u>Q/T</u>	<u>Q?</u>	<u>Score</u>	<u>Comments</u>
3x D12-0 → E9-4	0	?	T	-	-	Failed to eject chute.
3x D12-0 → E9-6	0	?	Q	N	DQ	Sustainer did not light, lawn darter.



Because none of the booster motors were positioned directly under the sustainer motor, the Thayer teams developed “chunk focusers” to direct the pieces of burning propellant from the booster motors toward the nozzle of the sustainer motor. The Freshman/Sophomore team cut the top off a soda bottle and placed it inside the booster above the motors for this purpose.

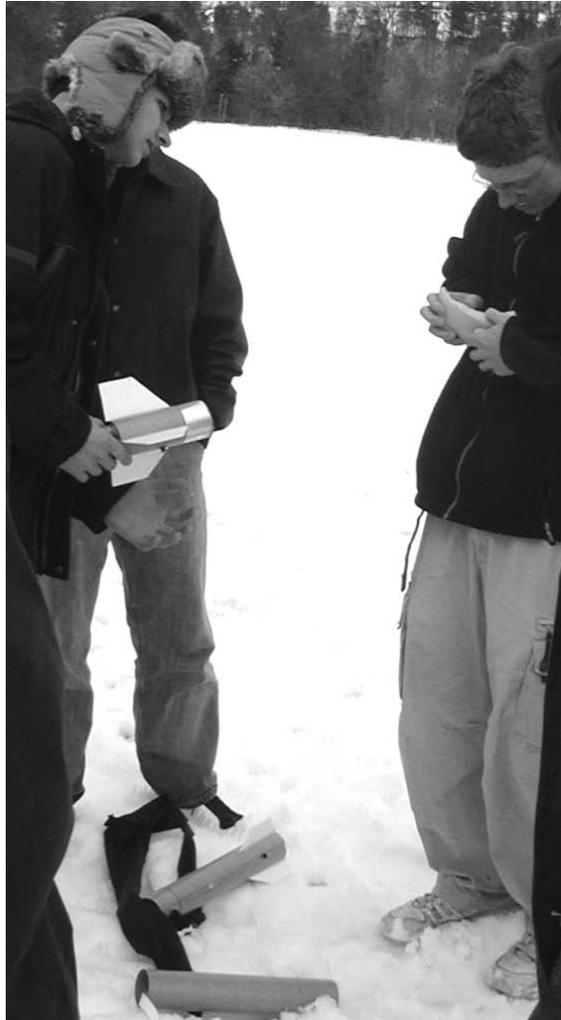
The first flight was nice and high, but the chute failed to eject, destroying the top stage. According to one team member, “There were splashes of egg thirty feet away.”

The team was back for the second launch with a rebuilt sustainer, but it was not to be as the sustainer motor failed to light and, again, plummeted back to earth.

(photos: Bill)

Junior/Senior Team, Thayer Academy, Braintree, MA

<u>Motors</u>	<u>Eggs</u>	<u>Alt.</u>	<u>Q/T</u>	<u>Q?</u>	<u>Score</u>	<u>Comments</u>
3x D12-0 → E9-6	1	1315	T	-	-	Streamer recovery, fast descent, hard landing.
3x D12-0 → E9-6	1	1183	T	-	-	Small chute, fast descent, hard landing.
3x D12-0 → E9-6	2	530	T	-	-	One booster motor did not light, sustainer flight horizontal.



The Thayer Junior/Senior team originated the “chunk focuser” idea, using a cutoff paper cone, like a transition shroud, inside the booster above the motors to direct burning particles from the three booster motors into the nozzle of the single sustainer motor. They flew only test flights at the CMASS launch, later making arrangements for their qualification flights.

Bottom Left: And this is your egg after too sudden a deceleration.

(all photos this page: Bill Spadafora)



A tale of two launches: March 20th at left and March 27th at right when the hay farmer required us to walk in because of the mud.

THE SENTINEL

The Sentinel is published irregularly by the Central Massachusetts Spacemodeling Society (CMASS) of Auburn, Massachusetts, which is section number 464 of the National Association of Rocketry (NAR).

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Please feel free to contact any or all of us with questions you have about CMASS, the NAR, or rocketry in Massachusetts.

CMASS Membership Form

Name _____ Birth Date _____
Street _____ Phone _____
City _____ State _____ Zip _____ Email _____

Membership type

NAR: Member number _____ HPR level: None 1 2 3

Associate: I agree to abide by the NAR Safety Codes when flying at CMASS launches.

Dues for twelve month's membership

\$4, 14 or younger

\$6, 15-17

\$8, 18 or older

Membership renewals are due either January 1st or July 1st, whichever is closest to the day you joined. Your membership expiration date is printed on the mailing label.

Make check payable to CMASS and mail with this form to:

CMASS, 248 Millbury Street, Auburn, MA 01501

CMASS Launches

2004 Proposed Launches

April 17	Amesbury
May 1	Amesbury
May 22	Tewksbury
June 19	Tewksbury
July 17	Amesbury
August 21	Acton
September 11	Tewksbury
October 2	Amesbury
October 23	Amesbury
November 6	Amesbury
November 20	Amesbury

Launch Day Schedule

9:30 setup range
10:30 launching starts
4:30 take down range

Amesbury: Woodsom Farm Park,
Amesbury, MA

Tewksbury: Livingston Street Park,
Tewksbury, MA

Acton: North Acton Recreation Center,
Acton, MA

Directions. Send email to:
secretary@cmass.org

Schedule Changes. Our schedule may change, for the latest information go to our Web site:
www.cmass.org

Weather Cancellation. *After* 8:00 AM on the day of the launch, if the weather looks questionable, call 781-231-1018 before heading to the site.

CMASS Club Meetings

Meeting Schedule

May 4, 18	Marlborough
June 1, 15	Saugus
July 6, 20	Marlborough
Aug 17	Saugus
Sept 7, 21	Marlborough
Oct 5, 19	Saugus
Nov 2, 16	Marlborough
Dec 7, 21	Saugus

Meetings are held the first and third Tuesday of each month from 7:00-10:00 pm. The location alternates each month between:

☞ Bill Spadafora, 5 Granby Street, Saugus, MA 781-233-0339

☞ Doug Steinfeld, 72 Prendiville Way, Marlborough, MA 508-481-9337

Please call for directions or to confirm a meeting. Changes in date or location are sent to the meeting@cmass.org mailing list (email webmaster@cmass.org to be added).

Note: no meeting August 3; Bill goes to NARAM.

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Central Massachusetts Spacemodeling Society
248 Millbury Street
Auburn, MA 01501